NEVADA TRANSPORTATION CENTER

StreetWise

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Winter storm preparedness and survival

Only the worst of forecasts keep many people at home during the winter. Fortunately, most motorists who venture out during severe winter weather manage to make it to their destination safely.

However, there are those who become temporarily stranded, and sometimes uncomfortably, for several hours or days as a blizzard rages. Occasionally the storm takes its toll, and reports of deaths hit the headlines.

Traveling in the winter without planning and being prepared for bad weather is dangerous. If vehicle trouble develops or an emergency arises, you may not be able to survive an extended period without the basics of shelter, food and clothing.

The wind can increase the effects of the cold as it further lowers your skin temperature. For instance, if the temperature is 30 degrees and there is a wind of 15 mph, exposed flesh will feel an effective temperature of 11 degrees.

If the temperature drops to minus 10 degrees and the wind rises to 30 mph, the effective temperature on bare flesh will be 63 degrees below zero. Your bare flesh will freeze very quickly.

Wind Chill Factor Comparisons

Temperature	Calm	15 m.p.h	30 m.p.h	40 m.p.h
30	30	11	-2	-4
20	20	-6	-18	-22
10	10	-18	-33	-36
0	0	-33	-49	-54
-10	-10	-45	-63	-69
-20	-20	-60	-78	-87
-30	-30	-70	-94	-101
-40	-40	-85	-109	-116

Wind speeds greater than 40 m.p.h. have little additional chilling effect.

Plan your trip

1. Obtain weather and road reports from a radio or television station or local law enforcement which receive updated reports hourly.
2. Tell someone of your plans, route, alternate route, destination and estimated time of arrival. When you arrive tell those who need to know.
3. Dress according to the weather and be prepared for worse conditions.
4. Do not leave without a full tank of fuel and check the engine's oil level.
5. Check your vehicle for survival equipment — don't leave without it.

Winter driving preparedness

Winter driving puts added strain on vehicles and drivers alike. Well-equipped and winterized, your vehicle can take you safely to your destination. In the event of an emergency, the well-equipped vehicle can provide you with lifesaving shelter and provisions.

You should always have a good spare tire, tire wrench and jack. Carry tire chains, container of sand, booster cables, tow rope or chain, gasoline antifreeze, windshield cleaner fluid, flares, repair tools such as pliers, wrenches and screwdrivers, pocket knife, bright red or orange cloth, 50 feet of nylon rope and a shrill plastic whistle for signalling.

Inside the vehicle you should carry a fire extinguisher and flashlight with spare batteries.

The following tips may help you get your vehicle in shape for winter driving:

- Check the headlights and tail lights. Do they all work correctly?
- Use the recommended weight and grade of oil in the engine for winter conditions. Low temperatures can cause oil to thicken, making starting more difficult and adding strain to the battery.
- The exhaust system needs to be free of leaks that can cause asphyxiation.
- The battery needs to be in top condition. The power of a battery declines as the temperature drops. Most of today's batteries are considered maintenance free and fluid levels cannot be checked. However, if the battery

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is nearing the end of its warranty life, it may need to be replaced. Be sure the terminals are clean and tight.

- The fan and alternator belts should be checked. Broken belts are not easy to replace in rough winter conditions and the engine may not run for very long without them.
- The engine cooling system must have antifreeze protection. Flush and replace antifreeze that is older than two years.
- The engine should be properly tuned for winter conditions. An out-of-tune engine can be very difficult or impossible to start in below-zero temperatures.
- The heater/defroster should work properly. Make sure the windshield wiper blades are in good shape. Good vision is essential in winter driving conditions.
- Brakes must be in good condition. Brakes that are poor in summer are much worse in winter.
- Keep the gas tank as full as possible. More condensation will form in a half-full tank than in a three-fourths full tank. Condensation can cause frozen fuel lines and stalled engines. Fuel filters should be clean and free flowing.
- Snow tires provide 51 percent more pull in snow and 28 percent more pull on ice than regular tires. Tire chains provide three times more pull in snow and six times more pull on ice. Use tire chains that fit properly.
- A good working radio will keep you advised of weather conditions. A CB radio or fully charged cell phone can expedite rescue and possibly save your life.
- There is little difference between snow tires and regular tires in stopping performance. However, tire chains can cut the stopping distance in half.
- Sand or salt bags often are put in the back of the vehicle for extra weight during the winter. Adding too much weight can adversely affect handling. As a rule of thumb add 75 pounds for subcompacts, 100 pounds for compacts and intermediates and up to 150 pounds for full-size vehicles.
- It is a mistaken notion that lowering the tire pressure in the rear wheels will improve traction. The lower tire pressure will wear tires faster, make handling very dangerous and adversely affect the ride.

Winter driving techniques

When your vehicle is tuned up and prepared for winter travel, knowing a few driving techniques can help you avoid trouble.

Starts must be slower and stops must be planned much more in advance. Turns cannot be taken as fast. Even tire chains on ice require as much as four times the distance to stop as regular tires on dry pavement.

If the vehicle goes into a skid, you should steer in the direction of the skid and remove all pressure from the gas pedal. As the vehicle starts to straighten out, steer accordingly so that it continues straight and in control. Apply pressure to the gas pedal only when you have obtained directional control of the vehicle.

Stopping on ice and snow is different than on dry pavement. The brake pedal should be pumped intermittently so that the wheels do not stop and remain locked up.

You do not have steering control when the front wheels are sliding. Pumping the brakes is the most effective way to stop the vehicle and maintain control.

You must plan your stops ahead of time. Always be prepared to stop because stopping the vehicle by pumping the brakes requires more time.

If you become stuck in snow, you often can rock the vehicle out without damaging the transmission.

Use the forward and reverse gears to move the vehicle back and forth in its stuck position. Stop the vehicle at the end of each forward or reverse run so that the driving wheels are stopped before shifting to the opposite direction.

Do not shift the transmission into the opposite gear if the driving wheels are still rotating. Press on the brake gently to stop them. Do not attempt to use speed to get out. It is harder on the drive system of the vehicle and can be more dangerous. Slow and easy is the best advice.

If the vehicle is hung up on accumulations of snow, then the snow under the vehicle must be removed before the vehicle is going to move.

First rule of survival

The first rule of survival when you become stuck or stranded in a storm is **STAY WITH THE VEHICLE!**

The only time you should dare to venture away from the vehicle is after the storm has cleared and you can easily see an occupied residence or business.

Your sense of direction is almost immediately lost when you attempt to walk in blowing snow. When you become disoriented in a white-out situation, you tend to walk in circles. The snow already has filled your tracks when you circle around to where you already have walked.

Soft snow from a storm is one of the most difficult conditions to walk in. Any snow depth of more than 4 inches causes you to walk in an unnatural, bent-over position. This posture coupled with your effort of lifting your feet much more than usual to clear the snow will fatigue you very quickly.

Exhaustion sets in while the cold and the wind accelerate your loss of energy. Your body cannot expend enough energy to maintain strength and internal body heat. Hypothermia quickly develops.

In your vehicle you are protected from the wind and cold. It requires much less energy consumption to stay with the vehicle.

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Many more storm survivors are found alive and well in their vehicle than are found walking around in the snow, wind and cold. It is a gruesome fact that those who leave their vehicle usually are found frozen in a snow bank or draped over a fence.

Steps to survival

If you get caught in a storm expect to spend three days in your vehicle. Therefore, plan to use your resources gradually. Be organized in what you do. Take time to consider each step carefully.

Periodically call for help on your cell phone or CB radio. Bad weather may cause freak transmissions and poor reception.

Tie a colorful, preferably red, banner on the vehicle antenna. Tie a nylon cord or rope to the vehicle and yourself if you must leave the vehicle for any distance during the storm.

Move all of your emergency supplies from the trunk to the interior of the vehicle as soon as you realize you will be staying for a while.

Put on your warm clothing before you get cold. It is easier to stay warm than it is to regain lost warmth. Loosen tight clothing so body heat can circulate. Remove metal jewelry as it can chill you.

Check your supplies to see what you have to work with and arrange them as to when you plan to use them.

Listen to weather reports on the radio. Prepare to send signals for help if road or rescue crews are reported to be in your vicinity. Flashing lights and horns can be effective.

Warm clothing

Warm clothing reduces body heat loss, making it easier to maintain a safe, comfortable body temperature. There are several ways to reduce heat loss.

Wear clothing in layers. One heavy coat is not as effective at maintaining body heat as is a number of layers of clothing. It is also easier to keep from overheating because clothing can be taken off a layer at a time. There must be an air space between the layers; the clothing must be loose.

Keep dry. Moisture takes away body heat. Replace damp socks with dry ones to keep your feet warm. Avoid exercise that brings on even a slight sweat. A chill results in loss of body heat — difficult to regain. A large plastic bag with arm and neck holes can substitute for waterproof covering if you must venture out.

Heating and ventilation

If additional warmth is needed, emergency heating devices can be used with extreme caution. Spilled fuel, a tipped over heater and combustibles too close to heaters all present a severe fire danger. The interior of a vehicle will burn amazingly easily.

Carbon monoxide is also an ever-present danger when you depend on combustion for heat. The danger of asphyxiation is a very important consideration when using these heaters in a confined space.

Here are some possible sources of emergency heat.

- A lighted candle provides very little heat but can be used for melting snow to drink.
- A can of Sterno will burn for about an hour depending on the size of flame and the size of the can. The open flame requires that considerable care be given to its use.
- Propane heaters will provide approximately 12,000 BTUs of heat. The open flame makes it a dangerous heater in the combustible interior of a vehicle. The size of the flame affects the burning time and the heat produced.
- Catalytic heaters used properly are considered to be quite safe except for the carbon monoxide poisoning risk.
- A roll of toilet paper can be put in a three-pound coffee can with a small amount of ethylene glycol antifreeze for fuel. The toilet paper acts as a wick and the anti-freeze burns with a low, clean flame, producing carbon monoxide.

Because all these heating sources use oxygen, always open a window slightly on both sides of the vehicle to prevent asphyxiation and to allow for moisture removal. Do not sleep with a heat source operating, it could asphyxiate you or tip over and start a fire.

A small, dry chemical fire extinguisher should be kept in your vehicle in case of an emergency.

The vehicle heater is an obvious source of heat. However, there are several problems with relying on it. Leaks in the exhaust system can cause carbon monoxide poisoning if the interior of the vehicle is not safely managed. The wind can carry exhaust fumes up to the air intake of the heater causing a build-up of carbon monoxide inside the vehicle.

Two other problems associated with using the vehicle's heater are managing the fuel supply and preventing the engine from icing up when it is periodically started, warmed up and then shut off.

If possible, face the vehicle into the wind. The vehicle and its heater are designed to operate safely in this position. Keep the exhaust clear of snow.

In a vehicle that does not face into the wind, open a window slightly on the upwind side for ventilation. This will tend to pressurize the interior of the vehicle with clean air and keep exhaust fumes out. An open window on the downwind side may actually draw exhaust fumes into the vehicle causing a build up of deadly carbon monoxide.

The fuel capacity of the vehicle may be another problem. The average eight-cylinder engine running at idle will consume about one gallon of gasoline per hour, while six and four cylinder engines will burn less. It is unlikely you will have more than a day's supply of fuel for continuous running of the engine when you become stranded.

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The coldest weather usually follows a blizzard, so you may want to conserve your fuel. You also will be faced with the problem of keeping the engine warm enough that it will start when you do need the heat. The best tactic probably is to run the engine intermittently.

Water, food and medicinal supplies

Make certain to carry a gallon of water. A lack of water can cause a dangerous state of dehydration. The body's most important need is for clean, drinkable water.

You'll need to drink one or two quarts of water each day. This can include other liquids such as soft drinks, fruit juice, liquids from canned goods, coffee, tea, cocoa or bouillon, but not alcoholic beverages. Melted snow should be used only if necessary and then it must be warm. Cold drinks will use up precious body heat.

Some emergency food should be taken along even though a healthy person can go without food for up to 30 days. Most storms will last only two to three days, so vast stores of food are not necessary. However, eating makes it possible for the body to produce more heat.

Along with a first aid kit, take a box of tissues, toothbrush and toothpaste, wet towelettes, needed medications such as insulin, sanitary supplies and a covered container for toilet use.

Don't get flustered

When stranded in a winter storm it is important to accept the fact that you will not be going any place for a while. Relax and take it easy.

Remember, there are those who successfully enjoy winter camping — sometimes under very severe conditions. However, they are definitely equipped for the weather. You can survive blizzards with adequate preparation and wise use of what you pack.

For additional information, contact the Nevada T^2 Center at the address shown below.

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